A rainwater harvesting roof for a water storage tank has a roof of relatively water-impermeable material substantially covering the tank. The roof has a central support supporting the roof, forming a peak, and the roof further has a substantially circumferential band of relatively water-permeable material located in the roof near the outer edge of the roof. The rainwater harvesting roof preferably also has a circumferential gutter of relatively water impermeable material depending downward from the interior surface of the roof and located beneath the substantially circumferential band of relatively water-permeable material. The circumferential gutter further has slits allowing the passage of water therethrough.
RAINWATER HARVESTING ROOF FOR WATER STORAGE TANK

CLAIM FOR PRIORITY

[0001] This application claims the priority of U.S. Provisional Patent Application, Ser. No. 62/128,282 and filing date Mar. 4, 2015, which application is incorporated in its entirety by reference into the present application.

BACKGROUND

[0002] 1. Technical Field

[0003] This application relates to apparatus and methods for collecting and saving rainwater or snow melt for later consumption or use.

[0004] 2. Background

[0005] Rain water may be collected for various purposes, such as drinking water, irrigation, cleaning, washing, household use, industrial use, agricultural use, and the like. Systems for collecting rain water can range from simple rain barrels to complex systems including filtration systems, pumps, cisterns, tanks, and the like. Conventional systems may collect rainwater from downsputs, for example, or may collect runoff from roofs adjacent to collection tanks. Several design issues with the collecting rainwater from roofs include providing for positive drainage of debris, filtering the rainwater, and providing a self-cleaning design for the roof. To provide water of acceptable quality with low public health risks, common design issues revolve around keeping out debris, sunlight, and insects. Also, the problems of the cost to build, transport and erect the water storage tank must be dealt with.

[0006] Some conventional rainwater-collection systems use a tent apparatus for a roof, but all of these known to applicant are uneconomical to erect and do not provide for filtering and debris removal from rainwater falling on the tent roof. What is needed is a roof system that sheds debris, protects the water from sunlight, and filters rainwater falling on the roof into a tank below, while the roof itself is self-cleaning and will not allow vermin and insects, particularly mosquitoes, to enter or breed in the tank.

[0007] In this specification, the term “above” refers to the direction toward the top of the drawing figures, and the terms “below” or “beneath” refer to the direction toward the bottom of the drawing figures.

DRAWINGS

[0008] FIG. 1 is a perspective view of an embodiment showing a collection tank and a roof.

[0009] FIG. 2 is a top view of the embodiment shown in FIG. 1.

[0010] FIG. 3 is a side view of an embodiment of a collection tank with a support system for a roof, with elements shown in phantom view.

[0011] FIG. 4A is a cut-away detail view of the tank and roof of an embodiment.

[0012] FIG. 4B is a perspective cut-away detail view of the tank and roof of an embodiment.

[0013] FIG. 5 is a perspective view of an embodiment with an additional opening for admitting rainwater.

[0014] FIG. 6 is a perspective view of an embodiment with an additional opening for a manned hatch.

SUMMARY

[0015] A rainwater harvesting roof for a water storage tank has a roof of relatively water-impermeable material substantially covering the tank. The roof has a central support supporting the roof, forming a peak, and the roof further has a substantially circumferential band of relatively water-permeable material located in the roof near the outer edge of the roof. The rainwater harvesting roof preferably also has a circumferential gutter of relatively water-impermeable material depending downward from the interior surface of the roof and located beneath the substantially circumferential band of relatively water-permeable material for the purpose of blocking sunlight from entering the tank. The circumferential gutter further has slits allowing the passage of water therethrough.

DETAILED DESCRIPTION

[0016] FIG. 1 shows a perspective view of a water-collection tank having a roof. In the embodiment of FIG. 1, the roof 110 of the tank 100 has an area of relatively impermeable material 120, which area of relatively impermeable material 120 has a roughly circumferential area of permeable material 130 near the outer edge of the roof 110. The circumferential area of permeable material 130 is preferably secured to the area of impermeable material 120 by sewing, but other connection methods, such as plastic welding or gluing could be used. The tank 100 could be any tank structure adapted for this use, such as a tank sold by Acer Water Tanks Inc. of San Marcos, Texas.

[0017] FIG. 2 is a top view of the tank 100 and roof 110 of FIG. 1, showing that the roof 110 is conveniently constructed of a plurality of gorges 140, where each gore 140 has an area of relatively impermeable material 120, each having a strip or area of relatively permeable material 130. A flat circle of impermeable material 120 could be used, but a roof 110 constructed of gorges 140 is preferable because the latter is more easily raised to a peak to form the roof 110. FIG. 3 is a side view of the tank 100 with the roof 110 not shown, so as to illustrate a system for supporting the roof 110 with guy wires 150 anchored on a central pole 160. This structure causes the roof 110 to be pitched, so that rain water will flow outward from the peak of the roof 110. Other systems for maintaining the raised roof 110 are possible, but a central pole 160 structure as depicted offers simplicity of construction and light weight. In FIGS. 1, 2, and 3, an optional overflow pipe 170 from the tank 100 is shown.

[0018] The relatively impermeable material 120 can be a canvas or cloth, such as the woven laminated polyethylene fabric sold under the trade name Canvaxen 7000 and manufactured by Gale Pacific USA, Inc. of Altamonte Springs, Fla. The relatively permeable material 130 can be, for example, a monofilament knotted polyethylene “shadecloth” fabric sold by the same company. The latter fabric has openings large enough to allow relatively free flow of water through it, while blocking the passage of contaminants such as leaves, insects, or bird droppings. Preferably, both the impermeable material 120 and the permeable material 130 are ultraviolet (UV) resistant. Further, the impermeable material 120 should be relatively opaque, so as to prevent the passage of sunlight through it. Sunlight falling in to the collected water in the tank 100 can promote undesirable algae growth. In all cases, if the collected water is to be used directly for human consumption, the materials for the roof 110 should meet food-safety standards.
FIG. 4A is a detail showing an embodiment of the connection of the roof 110 with the tank 100. In FIG. 4, the wall of the tank 100 allows for a bolt or screw 200 to pass through a fascia or ring 210 around the edge of the tank 100 (which may be only decorative) and the outer edge of the roof impermeable material 120, thus securing the roof impermeable material 120 to the top of the tank 100. The impermeable material 120 of the roof 110 preferably has a reinforced area 220 where it is secured by the ring 210 and the bolt or screw 200. These construction details are for illustration only, and do not limit the subject matter claimed.

FIGS. 4A and 4B also show a circumferential internal gutter 230 connected to the roof 110, and lying beneath the area of circumferential permeable material 130, and depending downward toward the interior of the tank 100. The gutter 230 is preferably constructed of the impermeable material 120, but, as shown in FIG. 4B, has slits 235 therein spaced at more or less regular intervals to allow the passage of water flowing through the area of permeable material 130 into the tank 100. This optional gutter 230 can provide additional blockage of sunlight into the tank 100. In practice, the circumferential internal gutter 230 would have slits 235 therein about three inches (7.6 cm) long spaced about 18 inches (46 cm) apart, although the exact dimensions are not important. The gutter 230 can be attached to the impermeable material 120 of the roof 110 by sewing at the boundaries between the impermeable material 120 of the roof 110 and the circumferential band of relatively water-permeable material 130.

FIG. 5 shows an embodiment having an opening 240 in the roof 110 for admitting rainwater in addition to the substantially circumferential band of relatively water-permeable material 130, where the opening 240 further has an area of relatively water-permeable material 130. Such an opening 240 could be used, for example, as an input to the tank 100 from a drain pipe attached to a building (not shown).

FIG. 6 shows an embodiment having an access hatch 250 in the roof 110 for manned access to the interior of the tank 100.

None of the description in this application should be read as implying that any particular element, step, or function is an essential element which must be included in the claim scope; the scope of patented subject matter is defined only by the allowed claims. Moreover, none of these claims are intended to invoke paragraph six of 35 U.S.C. Section 112 unless the exact words “means for” are used, followed by a gerund. The claims as filed are intended to be as comprehensive as possible, and no subject matter is intentionally relinquished, dedicated, or abandoned.

I claim:

1. A rainwater harvesting roof for a water storage tank; the rainwater harvesting roof comprising:
   a roof substantially covering the tank; a central support supporting the roof; whereby the roof has a peak at the central support; the roof further comprising:
   a relatively water-impermeable material; a substantially circumferential band of relatively water-permeable material located in the roof; the substantially circumferential band of relatively water-permeable material situated lower on the roof than the peak of the roof.

2. The rainwater harvesting roof of claim 1, where the roof is constructed in gorges.

3. The rainwater harvesting roof of claim 1, where the roof has an outer edge, and where the substantially circumferential band of relatively water-permeable material is located near the outer edge of the roof.

4. The rainwater harvesting roof of claim 1, where the roof further comprises:
   an opening for admitting rainwater in addition to the substantially circumferential band of relatively water-permeable material; the opening further comprising:
   an area of relatively water-permeable material.

5. The rainwater harvesting roof of claim 1, where the roof further comprises:
   an interior surface; and,
   a circumferential gutter of relatively water-impermeable material depending downward from the interior surface of the roof and located beneath the substantially circumferential band of relatively water-permeable material.

6. The rainwater harvesting roof of claim 5, where the circumferential gutter further comprises slits allowing the passage of water therethrough.

7. The rainwater harvesting roof of claim 1, further comprising an access hatch in the roof for manned access to the interior of the tank.

8. A rainwater harvesting roof for a water storage tank; the rainwater harvesting roof comprising:
   a roof substantially covering the tank; a central support supporting the roof; whereby the roof has a peak at the central support; the roof further comprising:
   a relatively water-impermeable material; a substantially circumferential band of relatively water-permeable material located in the roof near the outer edge of the roof; the substantially circumferential band of relatively water-permeable material situated lower on the roof than the peak of the roof; and, the roof further comprises:
   an outer edge;
   an interior surface; and,
   a circumferential gutter of relatively water-impermeable material depending downward from the interior surface of the roof and located beneath the substantially circumferential band of relatively water-permeable material; and,
   the circumferential gutter further comprises slits allowing the passage of water therethrough.

* * * * *